Econometrics. Faculty of Economics. Santiago de Compostela. Spain
in collaboration with Euro-American Association of Economic Development Studies
Working Paper Series Economic Development. No. 76
Year 2004

The Impact of Industry and Foreign Trade on Economic Growth in China. An Inter-Sector Econometric Model, 1976-2002.

GUISAN, M.Carmen
mcarmen.guisan @usc.es
EXPOSITO, Pilar pilarexposito@usc.es
Faculty of Economics and Business
University of Santiago de Compostela (Spain)

First published 18 May 2004. Updated 11-10-2019

Website: http://www.usc.es/economet/eaat.thm

1.- Introduction

The purpose of this paper is to present the estimation of a dynamic econometric model which shows the important impact than industrial production and foreign trade have on economic growth. The increase of real Gdp per inhabitant depends on a positive difference between the rates of real change between Gross Domestic Product and Population, being usually the educational level of population the main factor influencing that positive differences, according to several studies.

The good performance of the Chinese economy during the last decades of the 20th century is a good example for other Asian countries and for other areas of the world as well, and also an interesting experience to learn from that in order to pursue the target of increase real income per inhabitant in China.

Since 1980 the Chinese government has asked for advise to very distinguished members of the Economics research profession, as Chow(2001) remember in an interesting article. He says: "The importance of econometrics was well recognized in mainland China ever since the establishment of diplomatic relations with the United States in 1979. In the summer of 1980 a group of seven econometricians led by Lawrence Klein, including T.W. Anderson, Albert Ando, Gregory Chow, Chen Hsiao, Lawrence Lau and Vincent So, was invited by Xu Dixin, then Vice President of the Chinese Academy of Social Science, to lecture on econometrics in Beijing to about one hundred researchers selected from the whole country. Econometric model building has since taken root and econometric analysis has been applied for economic policy analysis". It is very interesting to see how the experience of other countries can help to design good economic policies for emerging economies, what it is a good example for international cooperation.

Some of the most important econometric models of the Chinese economy are presented in the interesting book by Klein and Ichimura(2000), which present models produced both inside and outside China, and we will present a more detailed reference to that interesting book in the final version of this paper.

In this paper we focus on the important role of manufacturing and imports to increase real income per inhabitant and non-agrarian employment. Some researchers specialized in economic growth analyse the export-led growth in many countries and insist upon the importance of openness to increase real Gdp. Often this type of beneficial effects seem very clear but it does not always happen that way. The important question in our view is not only to increase the degree of openness due in order to increase foreign demand but also to relate foreign trade with supply side having into account the general positive effects of imports on the domestic growth of industry, building and services.

Although a part of imports may happen to had a substitution effect, usually most imports are really complementary goods which contribute to foster and increase the internal production of goods and services. Thus we deem very important to have into account the positive impact of imports on the development of industry and services and for that purpose with present some econometric models of inter-sector relationships in section 3.

Before we present in section 2 a general view of economic growth in China during the second half of the 20th century, according to comparisons performed in Purchasing Power Parities, PPCs, based on data by Maddison and other approaches to measure real Gdp. Some discrepancies among several sources remain but in spite of that data let us know interesting relations about the main facts of economic development in China.

In sections 4 and 5 we present some complementary analysis of demography, expenditure on education, and foreign trade of China in comparison with other countries and areas, and we insist upon the convenience to foster education and international cooperation for development in China and in other areas. Regarding foreign trade it is remarkable to mention that the level of exports per inhabitant in China and other important countries of Asia, such as India, is yet very low and that it is important to foster international cooperation for development studying the problems that can arise for many small countries when the biggest ones of the world reach higher levels of exports.

2.- Economic growth China during the period 1950-2000

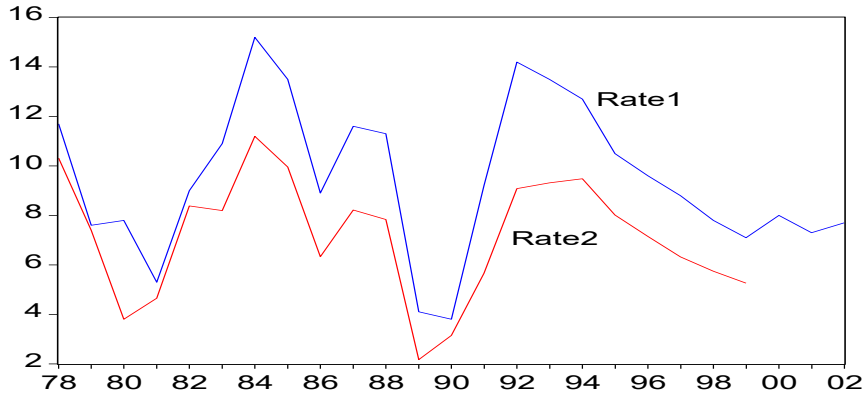
According to Ruoen and Kai(1995) it is important to use the purchasing power parity approach formulated by the UN International Comparison Program (ICP) because the methods based on exchange rates usually lead to important underestimation of the real values.
For the year 1991 they found important differences with an estimation of only $ 370 in Gdp per inhabitant of China according to the World Bank Atlas approach and a value between $ 1227 and $1663 in comparisons following PPPs.

Graphs 1 to 5 present the rates of growth of real GDP base on four interesting sources:

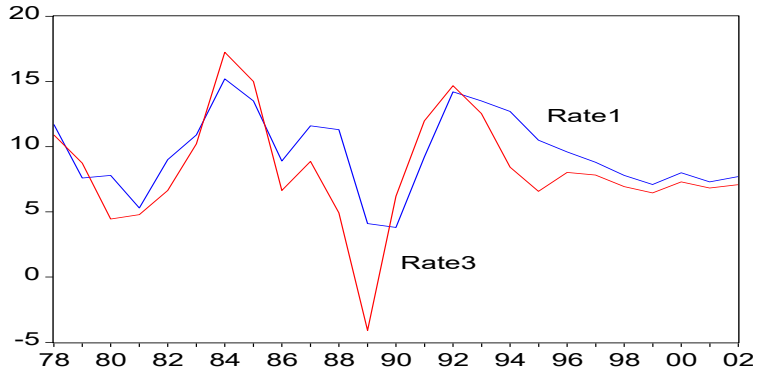
1) Rates published in Statistical Yearbook China, SYCN, for GDP. 2) Maddison(2001). 3) Rates calculated by us from total Value-Added, at constant prices income approach, as the sum of Valued-Added by sector at current prices of China published by IER(1997), deflacted by the index of prices of private consumption, IPPC, from SYCN. 4) Rates by sector at constant price production approach according to SYCN, based on sectoral deflactors.

Graphs 1 present a comparison of the rates of growth based on sources 1 and 2, while graphs 2 present a comparison between sources 1 and 3.

Graph 1. Rates of annual growth of real GDP according to sources 1 (SYCN) and 2 (Maddison)



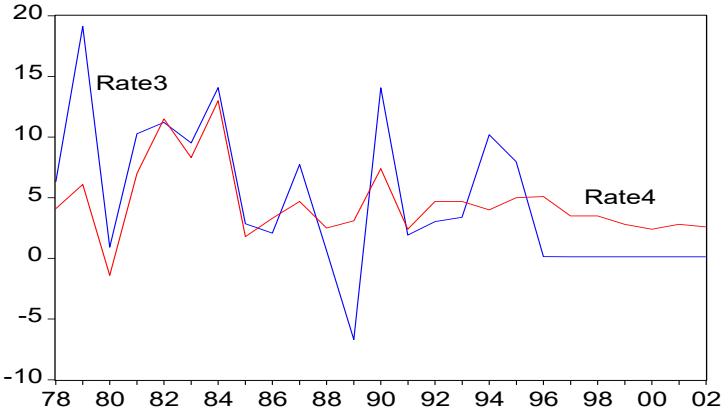
Graph 2. Rates of growth of real GDP according to sources 1 (SYCN) and 3 (IER deflacted by IPPC)



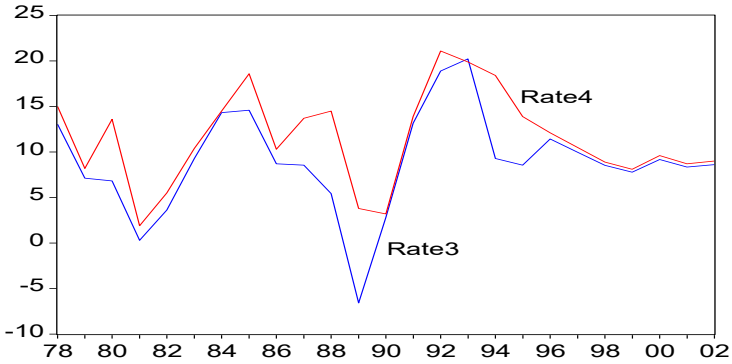
We notice a greater similarity between sources 1 and 3 than between 1 and 2, with the exception for year 1989 when the index of prices of private consumption could be in some degree overestimated. Besides we compare the rates of growth of real Value-Added by sector for Agriculture, Industry (including Building) and Services, according to sources 3 and 4.

Graphs 3 to 5 show the differences in rates by sector from criteria 3 and 4, where the blue line represents data from source 3 and the red line corresponds to data from source 4. Source 3 measures real Value-Added according to the income approach while source 4 corresponds to the production approach. Both approaches present generally a high degree of similarities although with some important discrepancies in particular years.

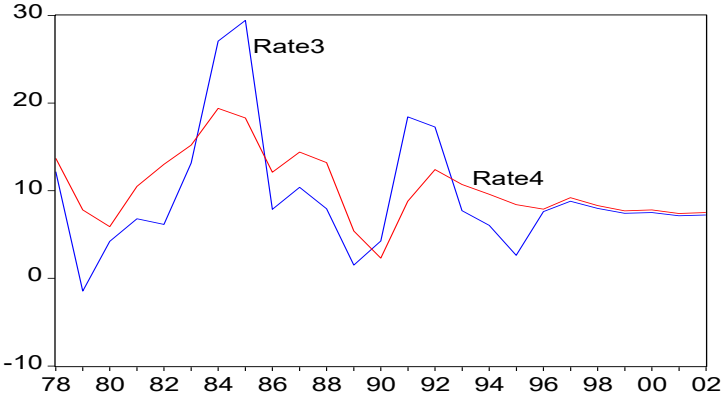
Graph 3. Exponential rates of real GDP of Agriculture



Graph 4. Rates of annual growth of real GDP of Industry

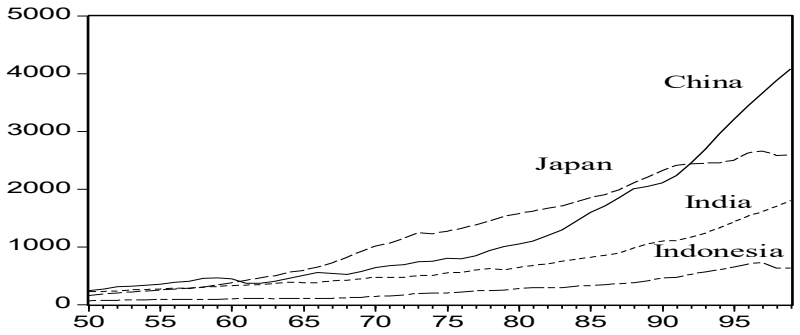


Graph 5. Exponential rates of real GDP of Services



Graph 6 shows the substantial increase of real Gdp in China, Japan, India and Indonesia during the period 1950-99, according to the data by Maddison, and graph 7 shows the evolution of China according to approaches 2 and 3 together with USA, Western Europe and India.

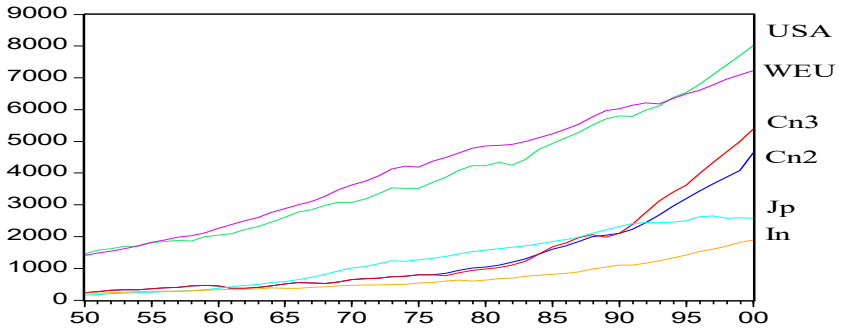
Graph 6. Evolution of real Gdp in the largest Asian countries. (Billions Dollars at 1990 prices)



Source: Guisan and Exposito(2003)

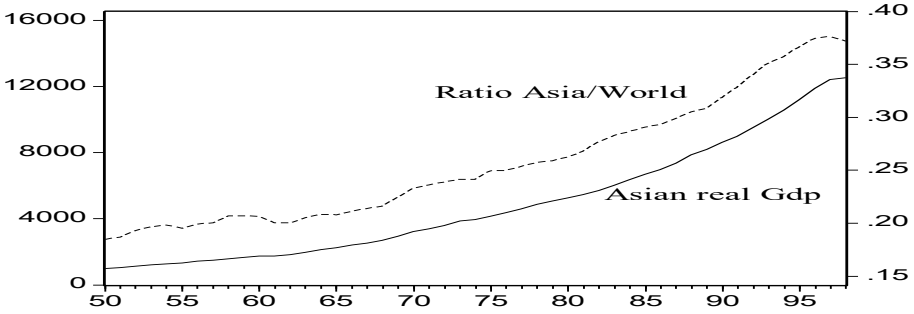
We can see the substantial growth of China since 1977, particularly from 1988. Although India experienced an important growth in comparison with other areas, it was relatively moderate in comparison with

Graph 7. Real Gdp of China and other countries. (Billion US dollars at 1990 PPPs)



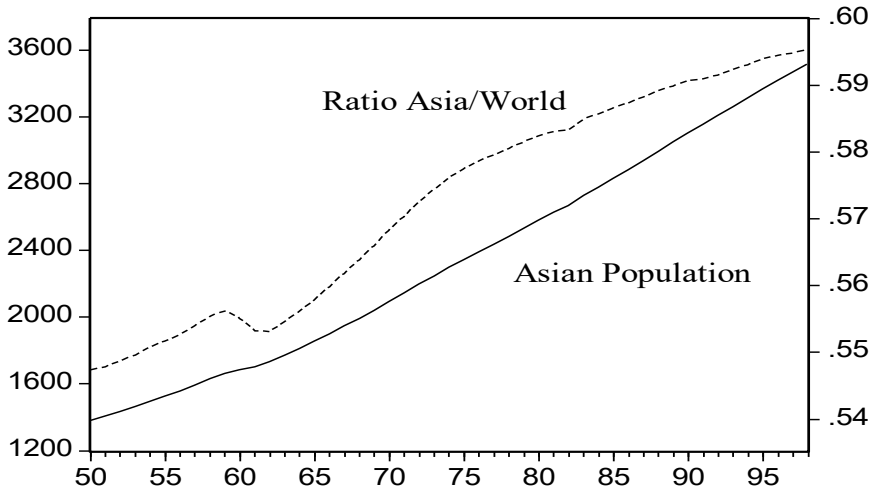
The subsequent graphs 8 and 9 show the evolution of real Gdp and Population for Asia during the period 1950-98, as well as the share of these variables of the corresponding world values. Although Asian countries underwent a significant increase in total production during the final decades of the century, the problem is that many of them also had excessively high rates of population growth, a situation which makes the eradication of poverty and the increase of real Gdp per inhabitant difficult.

Graph 8. Evolution of real GDP in Asia, Billion US$90



Source: Guisan and Exposito(2003)

Graph 9. Evolution of Population in Asia
(millions of inhabitants)

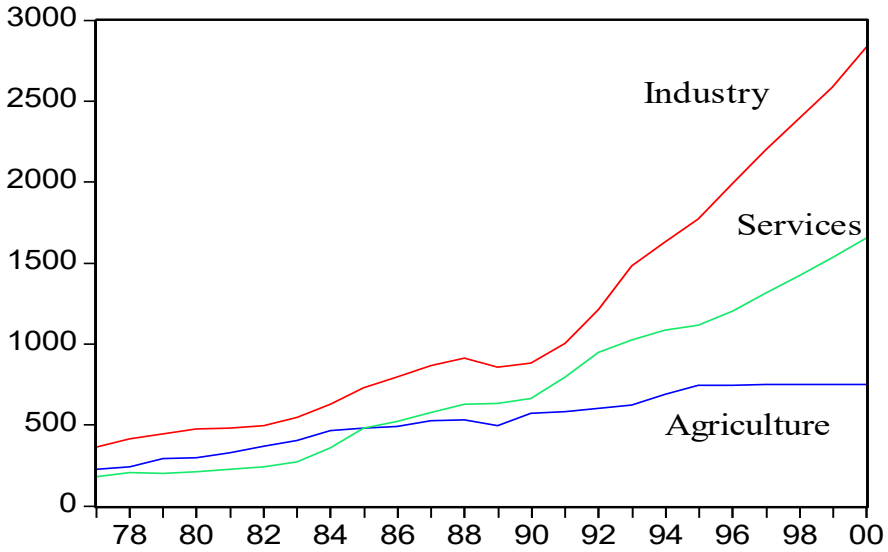


Source: Guisan and Exposito(2003)

During the second half of the 20th century the share of Asia in world population terms increased from 55% to nearly 60% while real Gdp also increased its share from 20% of world Gdp to almost 40%. In that period China experienced an increase of the share on Gdp and a slight decrease on the share of population.

Finally graph 10 presents the evolution of real Value-Added by sector in China according to approach 3, in billion dollars at prices and Purchasing Power Parities of year 2000.

Graph 10. Real Value by Sector in China
(Billion US dollars at 2000 prices, PPPs)



3.- Econometric Model for impact of Industry and Foreign Trade

Some econometric models cited in the bibliography, as Martin et al(2000) analyses the positive impact of imports on production through the spill over effect of technology in internal productivity and production, and other effects of foreign trade on economic growth.

The great importance of the increase of complementary imports on internal production usually is not highlighted according its relevant role in the explanation of real Gdp. Many macro-econometric models mainly consider the export-led impact on demand side and a subsequent increase in imports due to growth of Gross Domestic Product. Really in many countries, specially in developing ones, we find that the import-led impact on supply side to be very important because the increase of imports of many complementary goods and services is needed to increase internal production. Exports are important because they are the main source to finance imports. Its demand side effect could be substituted by an increase in internal demand but that option should not let to increase the capacity to imports.

We have estimated econometric models in several OECD countries, such as the USA, Japan, France, Spain, and Ireland, and in some non-OECD countries, such as Argentina, Brazil, Mexico and China, and we have found that the increase in real Imports usually shows an important positive impact both on manufacturing and services, because the imported goods are in major degree complementary of internal production and at a lesser extent they have some substitution effects.

Here we present some econometric relationships between real value-added in services: Q3CN according to the source of data named approach 3 in section 2, and QS90CN according to the source of data named approach 4. Q3CN is expressed in billion dollars at 2000 prices and PPPs and QS90CN in billion dollars at 1990 prices and PPPs.

Equation 1. Real value added of Services, approach 3, Q3CN

Dependent Variable: Q3CN				
Method: Least Squares				
Sample(adjusted): 1979 2002				
Included observations: 24 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Q1CN)	0.111573	0.230579	0.483882	0.6340
D(Q2CN)	0.278338	0.151083	1.842285	0.0811
D(IMP00CNPP)	1.403538	0.870542	1.612258	0.1234
D(EXP00CNPP)	-0.034645	1.114838	-0.031076	0.9755
Q3CN(-1)	1.028796	0.024137	42.62321	0.0000
R-squared	0.996969	Mean dependent var		866.4366
Adjusted R-squared	0.996331	S.D. dependent var		533.0612
S.E. of regression	32.28904	Akaike info criterion		9.970384
Sum squared resid	19809.05	Schwarz criterion		10.21581
Log likelihood	-114.6446	Durbin-Watson stat		1.319559

Equation 2. Real value added of Services, approach 4, QS90CN

Dependent Variable: QS90CN				
Method: Least Squares				
Sample(adjusted): 1979 2002				
Included observations: 24 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QA90CN)	0.561383	0.240885	2.330505	0.0310
D(QI90CN)	0.280485	0.090982	3.082875	0.0061
D(IMP90CN)	0.369223	0.492057	0.750367	0.4622
D(EXP90CN)	-0.303982	0.498635	-0.609629	0.5493
QS90CN(-1)	1.029552	0.015035	68.47771	0.0000
R-squared	0.999234	Mean dependent var		1137.071
Adjusted R-squared	0.999073	S.D. dependent var		695.7370
S.E. of regression	21.18517	Akaike info criterion		9.127532
Sum squared resid	8527.421	Schwarz criterion		9.372960
Log likelihood	-104.5304	Durbin-Watson stat		1.038877

In equations 1 and 2 real value added of Services is related with the internal production of Agriculture and Industry, the real value of imports and exports and the lagged value of the demand variable, through a dynamic relatioship where the dependent variable and its lagged value are in levels and the other variables are in first differences.

In equation 1 foreign trade variables are expressed in purchasing power and in equation 2 according to exchange rates. Although there is some degree of multicollinearity, these estimations show the positive impact of imports and real value added of Agriculture and Industry on the internal production of Services.

Impact of industry on Exports, Imports and Development: Regarding Exports we find that industrial development contributes positively to increase Exports of goods, and the increase of Exports contributes to increase the capacity to Import goods and services that have a positive effect on real value of Services. The final effect of Exports of goods and services on economic development is positive, as we may notice having into account the sum of the coefficients of Imports and Exports in equation 2. As exports are needed to increase imports, the final effect of exports is positive. These results agree with those that we found in the estimations of other OECD and non-OECD countries.

Besides the positive effect on Services, Imports have also a positive effect on Industry, so the final effect on real Gdp is quite relevant and positive.

Equation 3 shows the relation of Industry with some demand and supply side variables: From the demand side the increase in Q3CN(-1) (previous year internal Services) and EXP90CN(-1) (previous year external demand). From the supply side the increase in the production of Agriculture and the increase in Imports. The model present some degree of autocorrelation probably due to the effects of some missing explanatory variables. We shall analyse with more detail this question.

Equation 3. Real value added of Industry, Q2CN. Supply and Demand sides.

Dependent Variable: Q2CN				
Method: Least Squares				
Sample(adjusted): 1981 2000				
Included observations: 20 after adjusting endpoints				
Convergence achieved after 8 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Q1CN)	0.424218	0.372788	1.137959	0.2742
D(Q3CN(-1))	0.411456	0.316847	1.298596	0.2151
D(IMP00CN)	1.268333	0.659216	1.924003	0.0749
D(EXP00CN(-1))	0.719816	0.918447	0.783732	0.4463
Q2CN(-1)	1.055844	0.024467	43.15343	0.0000
AR(1)	0.585777	0.234441	2.498617	0.0255
R-squared	0.996847	Mean dependent var		1314.569
Adjusted R-squared	0.995721	S.D. dependent var		746.2337
S.E. of regression	48.81290	Akaike info criterion		10.85719
Sum squared resid	33357.78	Schwarz criterion		11.15591
Log likelihood	-102.5719	Durbin-Watson stat		1.634124
Inverted AR Roots	.59			

The positive impact of Imports from the supply side seems to be higher and more significant than the direct positive impact of Exports from the demand side.

Equation 4 presents a similar relationship more simplified, without the demand side effects.

Equation 4. Real value added of Industry, Q2CN. Supply side.

Dependent Variable: Q2CN				
Method: Least Squares				
Sample(adjusted): 1980 2000				
Included observations: 21 after adjusting endpoints				
Convergence achieved after 9 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Q1CN)	0.268661	0.339611	0.791082	0.4398
D(IMP00CN)	1.581133	0.612464	2.581595	0.0194
Q2CN(-1)	1.076707	0.020982	51.31526	0.0000
AR(1)	0.610895	0.213587	2.860166	0.0108
R-squared	0.996515	Mean dependent var		1274.725
Adjusted R-squared	0.995900	S.D. dependent var		749.9066
S.E. of regression	48.01984	Akaike info criterion		10.75075
Sum squared resid	39200.39	Schwarz criterion		10.94971
Log likelihood	-108.8829	Durbin-Watson stat		1.553864
Inverted AR Roots	.61			

We think that usually, like in the case of China, the supply side effects on Industry are more important than the demand side ones, because generally it is easier to increase demand to meet supply and to increase supply to meet demand.

The estimated equations show generally a coefficient higher than unity for the lagged value of the dependent variable, in many cases significantly higher than one. This result show that the chosen functional form of dynamic models mixed (with levels for the

endogenous variable and first differences for the exogenous ones) perform usually better than models with all variables in levels or in first differences.

4.- Production by sector and foreign trade in China and Asia-Pacific, 1980-98.

The following tables present the evolution of real production by sector and inhabitant in 6 large areas of Asia and the South Pacific.

Euro-Asian countries like Russia, Turkey and Trans-Caucasian countries of Armenia, Azerbaijan and Georgia are not included here but in the report on European and Eurasian countries of Guisan and Aguayo(2002) as these countries have decided to form part of the Council of Europe.

Besides these, this report also excludes the five North Central Asian countries that belonged to the former USSR and which have decided, in the year 2000, to become members of the Euro-Asian Economic Community together with Russia and Belarus. They are Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. They have been included in the above mentioned study.

Data is expressed at 1999 prices and purchasing power parities, based on our own calculations from international data published by World Bank, United Nations, and other institutions.

The countries and territories with more than one million people included in the 6 areas of Asia and South Pacific during the period 1980-99 are the following ones:

1. *Western Asia or Near East*: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Territories, Saudi Arabia, Syria, United Arab Emirates and Yemen.

2. *South Central Asia or Middle East*: Afghanistan, Iran, and Pakistan.

3. *India and South*: Bangladesh, Bhutan, India, Nepal and Sri Lanka.

4. *China, Japan and North East*: China PR, Hong-Kong (China), Japan, North Korea, Mongolia, Taiwan and South Korea.

5. *Indochina or South East*: Cambodia, Lao, Myanmar, Thailand and Vietnam.

6. *South Pacific*: Australia, Indonesia, Malaysia, New Zealand, Papua-New Guinea, Philippines and Singapore.

This classification in large areas takes into account population size, geographical criteria and other international criteria.

Population size varies between 100 and 400 million people in 4 out of the 6 areas, and is higher than 1000 million in the cases of the largest areas of *India and South* and *China and North East*.

Some countries with more than one million inhabitants are not included in the tables by country because of problems of unavailability of data from the international sources utilized.

Furthermore, there are small countries and territories with less than one million inhabitants in 1999, such as the emirate of Qatar in West Asia, the Maldives in South Asia, Macao(China) in North East Asia, and several more small countries and territories in the South Pacific islands, such as Brunei and Timor Oriental in the proximity of Indonesia, and many others situated further into the Pacific.

Those small countries of territories include islands and archipelagos such as Fiji, Kiribati, New Caledonia, Salomon Islands, Samoa, Tonga, Tuvalu Vanuatu, Micronesia, French Polynesia, Guam, the Marshall Islands, Palau and the Virgin Islands.

Table 1 shows the estimation of real Gdp and the values of Population for all of the countries of Asia and South Pacific areas, including also the small countries and territories and others not included in the tables due to incomplete data.

Table 1.Gross Domestic Product and Population 1980-99: Asia-Pacific
(Billions of dollars at 1999 prices and PPPs and millions of people)

Area	Gdp80	Gdp90	Gdp99	Pop80	Pop90	Pop99
1.Western Asia	504.4	551.2	718.8	53.3	75.0	102.4
2.South Central	326.1	433.7	666.9	137.3	186.7	223.2
3.India+South	940.5	1574.7	2670.5	804.5	996.0	1168.7
4.China and N.E	2901.6	5330.1	8895.0	1142.8	1308.0	1432.6
5.Indochina	250.8	432.4	740.4	179.3	219.6	245.0
6.South Pacific	778.9	1130.1	1725.3	236.4	287.7	340.9
Asia-Pacific	5702.3	9452.2	15416.9	2553.6	3073.0	3512.8
World	23831	32573	41961.0	4428.6	5262.0	5970.6

Source: Guisan and Exposito(2001).

There were very important increases in real Gdp during the period 1980-99, more moderate in Western Asia, with an increase of 43%, followed by 105% in South Central Asia, 122% in the South Pacific, 184% in India and South, 195% in South East and 207% in China and North East. The general increase of Asia-Pacific real Gdp, in this period, was 170%.

Population experienced an excessive growth in many areas, although we can see a diminution in the yearly rates during the period 1990-99 in comparison with 1980-90.

The highest percentages of population increase during the period 1990-99 correspond to Western Asia with 92%, South Central Asia with 63% and India and South with 45%, while the lowest percentages of increase correspond to South Pacific with 44%, Indochina with 37% and the area of China and North East with 25%,

The areas and countries with the highest rates of increase in real Gdp per inhabitant are those which experienced a greater difference between the rate of growth of real Gdp and

the rate of growth of population, China and North East being the most prominent area in this regard.

All the areas, with the sole exception of *Western Asia*, experienced rates of increase in real production higher than their rates of increase in population and thus experienced increases in total production per inhabitant during the period 1980-99.

Tables 2 and 3 present the data for North East Asia, and we can see a variety of situations in the its countries. China, the most populated country in the world has experienced very high rates of economic development since 1980, and multiplied the real value of total production per inhabitant, during the period 1980-99, by a factor of nearly 5.

This highly positive evolution occurred largely beyond the year 1987, thanks to the increase in the educational level of population, industrialization and economic policies introduced to foster production and trade.

Japan was the most dynamic Asian economy during the second half of the 20th century, with a level of production per inhabitant in 1999 ranking among the top World positions, with 25975 Dollars (value accordingly to Purchasing Power Parities, PPPs).

Table 2. Gdph by sector in China, Japan and North East:
Agriculture and Total (Dollars at 1999 prices and PPPs)

	Agriculture		Total	
Country	1980	1999	1980	1999
China	314	638	763	3753
Hong-Kong China	1	14	10563	22159
Japan	557	519	16359	25975
Korea South	627	812	4882	16235
Mongolia	526	511	1463	1597
Total Area	348	630	2539	6209
Asia-Pacific	430	629	2324	4389
World	462	591	5434	7031

Source: Guisan and Exposito(2003).

Table 3. Gdph by sector in China, Japan and N.E.: Industry and Services
(Collars per inhabitant at 1999 prices and PPPs)

	Industry		Services	
Country	1980	1999	1980	1999
China	249	1876	201	1238
Hong-Kong China	2099	3324	8464	18835
Japan	6256	9611	9546	15845
Korea South	1644	7143	2610	8280
Mongolia	425	447	512	639
Total Area	917	2736	1273	2843
Asia-Pacific	761	1695	1133	2065
World	1732	2285	3240	4154

Source: Guisan and Exposito(2003)

Table 4. Production per head in large areas of Asia-Pacific:
Agriculture (a) and Total (t) (Dollars per capita at 1999 prices and PPPs)

Area	Ph80a	Ph90a	Ph99a	Ph80t	Ph90t	Ph99t
1. Western Asia	610	641	541	9463	7350	7020
2. Central Asia	372	566	628	2375	2323	2988
3. India and South	489	534	628	1169	1581	2285
4.China and N. East	348	499	630	2539	4075	6209
5.Indochina	461	516	645	1399	1969	3022
6.South Pacific	592	637	645	3295	3928	5061
Total Asia-Pacific	430	532	629	2324	3076	4389
World	462	529	591	5434	6191	7031

Source: Own elaboration based on World Bank, and international statistics.

Table 5. Production per head in large areas of Asia-Pacific:
Industry (i) and Services (s) (Dollars at 1999 prices and PPPs)

Area	Ph80i	Ph90i	Ph99i	Ph80s	Ph90s	Ph99s
1. Western Asia	4600	3101	2940	4252	3607	3538
2. Central Asia	1006	632	880	998	1126	1480
3. India and South	248	384	575	431	662	1082
4.China and N. East	917	1544	2736	1273	2032	2843
5.Indochina	310	558	999	628	895	1378
6.South Pacific	1091	1291	1819	2605	2000	2597
Total Asia-Pacific	761	1056	1695	1133	1487	2065
World	1732	1940	2285	3240	3721	4154

Source: Own elaboration based on World Bank and international statistics.

During the period 1980-99, Asia-Pacific experienced an increase of 46% in real value of production per inhabitant in Agriculture, 123% in Industry, 82% in Services and 89% in Total, while the corresponding percentages of increase at World level where much lower: 28% in Agriculture, 32% in Industry, 28% in Services and 29% in Total. All the areas, with the exception of Western Asia, experienced a positive evolution during the period 1990-99, and several of them also during 1980-90.

We can notice that the countries and areas with the highest levels of production in industry usually have the highest levels of production in services, because both sectors have important interrelationships.

Table 6 . Exports of Goods and Services in large areas, Asia-Pacific
(Dollars per capita at current prices)

	1990			1998		
Area	Goods	Services	Total	Goods	Services	Total
Western Asia	1341	218	1559	1149	277	1426
South Central	134	9	143	110	12	122
India+South	22	5	27	37	11	48
China+N.E.	380	57	437	617	101	718
Indochina	145	37	182	328	82	410
South-Pacific	585	121	705	1002	185	1187
Asia-Pacific	269	45	314	421	76	497
World	657	154	810	917	224	1141

Source: Elaborated by Guisan and Exposito(2003) from WB statistics.

Table 7. Exports of Goods in China, Japan and North East
(Dollars per capita at current prices)

Country	1990	1998
China	55	148
Hong-Kong China	14442	26012
Japan	2328	3073
Korea South	1517	2857
Mongolia	301	145
Total Area 4	380	617
Asia-Pacific	269	421
World	657	917

Source: Elaborated by Guisan and Exposito(2003) from WB statistics.

In the next section we present data by countries and areas corresponding to the educational level of population and other variables which are very much related to economic development.

5.- Education, demography and development

Here we analyse some data of Education Expenditure per inhabitant, Total Years of Education of adult population and Fertility rates in China and Asia-Pacific, based in Guisan and Exposito(2001) and (2003) and the international sources of data there cited.

Eduh = Public expenditure on Education per inhabitant, in 1995 in dollars at that years prices and PPPs.

Tyr99 = Total average years of schooling by adult in 1999.

Fer00 = Fertility rates, average number of children expected by woman during her life, corresponding to population of year 2000.

Table 8. Population, Education and Fertility in areas of Asia-Pacific

Area	Pop80	Pop90	Pop99	Eduh	Tyr99	Fer00
Western Asia	53	75	102	245	4.6	5.3
South Central	137	187	223	128	3.3	4.7
India + South	804	996	1169	46	4.5	3.4
China + N.E.	1143	1308	1433	149	6.2	1.7
Indochina	179	220	245	99	4.7	2.8
South Pacific	236	288	341	157	6.0	2.8
Asia-Pacific	2554	3073	3513	112	5.3	2.7
World	4429	5262	5971	258	5.8	2.8

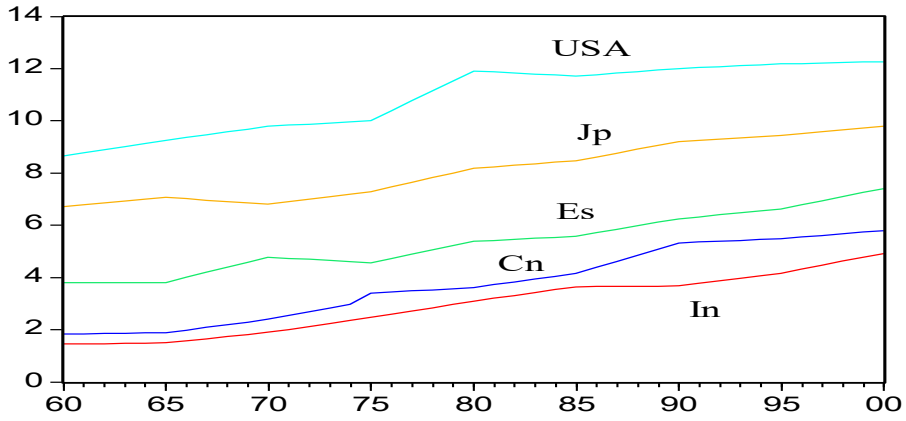
Source: Guisan and Exposito (2003) and international sources of data.

Table 9. Population, Education and Fertility in China, and N. East

Country	Pop80	Pop90	Pop99	Eduh	Tyr99	Fer00
China	981.2	1133.7	1249.7	48	5.7	1.8
H-K China	5.0	5.7	6.9	646	9.5	1.2
Japan	116.8	123.5	126.6	1003	9.7	1.4
Korea South	38.1	42.9	46.8	443	10.5	1.5
Mongolia	1.7	2.2	2.6	172	5.2	2.7
Total Area 4	1142.8	1308.0	1432.6	149	6.2	1.7
Asia-Pacific	2572	3097	3542	112	5.3	2.7
World	4429	5262	5971	258	5.8	2.8

Source: Guisan and Exposito (2003) and international sources of data.

Graph 11.Total Years of Education in China, India and 3 OECD countries.



Sources: Elaborated from Barro and Lee(2000) and other sources.

In Guisan, Aguayo and Expositio(2001) we show that an increase in the variable TYR of 2 unities imply a decrease in the fertility rate for countries with educational levels between 2 and 8 years of education per adult. This has a very positive effect on the increase of real Gdp per inhabitant because the moderation of demographic rates. Besides education has other very important positive effects on productivity, and so according to several authors cited in the bibliography we want to express our support for the increase of the educational level of population in China, India and all the other developing countries, because it is the main priority for their development.

Besides that the increase in foreign trade and industrial production are also an important priority for China and other developing countries.

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2 http://www.usc.es/economet/eaat.htm
3 http://ideas.repec.org